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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/836,369	04/18/2001	Yuichi Hashimoto	35.G2780	6891

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EXAMINER

CLEVELAND, MICHAEL B

ART UNIT PAPER NUMBER

1762

DATE MAILED: 01/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/836,369

Applicant(s)

HASHIMOTO ET AL.

Examiner

Michael Cleveland

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5 and 9-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 3, 5, 9-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 5, 9, and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (U.S. Patent 6,420,834, hereafter '834) in view of Matsuura et al. (U.S. Patent 6,001,413, hereafter '413).

Claim 1: '834, Embodiment 2 (Figure 3), teaches a method of making an organic (electro)luminescent (EL) device comprising the steps of:

forming a first electrode (104, 311) on a substrate (col. 3, line 60-col. 4, line 16; col. 6, lines 18-20),

evaporating an organic layer on the first electrode (col. 4, lines 14-30; col. 6, lines 7-46);
and

forming a second electrode on the organic layer (col. 4, lines 31-48),

wherein the organic layer is formed by applying a voltage to the first electrode (col. 6, lines 25-38) without generating a plasma (No plasma is used in Embodiment 2; compare and contrast to Embodiment 4 in col. 8). (The voltages referred to must be consistently positive and negative to achieve the repulsion characteristics described at col. 5, lines 9-32. Therefore, they must be DC voltages.)

The first electrode is driven by a positive voltage (col. 6, lines 32-38). A positive voltage drives an electrode as an anode (col. 5, lines 2-14).

'834 does not explicitly teach that the deposited EL layer is a hole-transporting layer, but does teach that EL layer (851), which may be deposited by the method of Fig. 3 (i.e., embodiment 2) (col. 17, lines 55-56) may include a hole-transporting layer (col. 18, lines 1-5). Therefore, the fair teaching of '834 is that the hole-transporting layer may be deposited by the method of Fig. 3. However, the examiner takes Official Notice that it is well known in the art of

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organic EL devices for organic hole-transporting compounds to be organic compounds deposited by vapor deposition. See, for example, 413, col. 6, lines 6-10. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have deposited an organic hole-transporting layer by the method of Embodiment 2 with a reasonable expectation of success because '834 teaches that the EL layer may comprise a hole-transporting layer and that such layers may be deposited by the vapor deposition method of Embodiment 2 and because '413 confirms that it is known in the art to deposit such organic hole-transporting layers by vapor deposition.

Claim 3: The organic layer is formed by resistance heating evaporation ('834, col. 5, line 67-col. 6, line 2; '413, col. 6, lines 50-68).

Claim 5: The anode may be indium tin oxide (col. 3, lines 63-65, col. 11, lines 59-61; col. 17, lines 33-35).

Claim 9: Yamazaki '834 describes formation of an EL device by deposition of an organic layer on an electrode while driving it as an anode, as described in the discussion of claim 1, above. It does not teach an oxygen or inert gas plasma surface treatment of the electrode before depositing the organic layer.

Matsuura '413 teach that in forming EL devices, it is desirable to clean the ITO anode with an oxygen and inert gas (such as argon) plasma (col. 6, lines 4-37) in order to prevent contamination (col. 11, lines 39-61). The subsequent organic EL layer(s) are deposited on the cleaned substrate without breaking vacuum also to prevent contamination (col. 6, lines 43-61; Abstract; col. 2, lines 18-50). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have plasma cleaned the ITO anode of Yamazaki '834 and then deposited its organic layer without breaking vacuum because Matsuura '413 teaches that plasma cleaning and then deposition without breaking vacuum would have reduced the effect of contaminants on the resulting EL device.

Claims 12-13: '834 is silent as to the voltage to be applied to the electrode during deposition. However, col. 5, lines 9-32 describe that the operation of the invention occurs because the banks (105b) on the substrate where deposition is not desired are given the same charge as the EL material being deposited, and therefore the banks repel the EL material. Likewise, the chamber walls and the substrate holder may be given the same charge also to repel

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the material (col. 6, lines 11-32). It is therefore apparent that the EL material is therefore attracted to the oppositely-charged electrodes because opposite charges attract and like charges repel. The degree of attraction or repulsion is controlled by the magnitude of the voltages. Larger voltages would have provided greater degrees of attraction or repulsion, but would have required more energy. Therefore, the positive and negative voltage are result-effective variables because they affect the degrees of attraction and repulsion and the energy cost during deposition. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have optimized the voltages for the best balance of attraction to the electrodes, repulsion from the non-deposition surfaces and cost, particularly in view of the teachings of '834 that the determination of the voltages may be determined by the implementers (col. 5, lines 9-19).

3. Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki '834 in view of Matsuura '413, as applied to claim 9, above, and further in view of Leiphart (U.S. Patent 6,187,151, hereafter '151). (Ameen et al. (U.S. Patent 5,834,371, hereafter '371) is further cited as evidence in the discussion of claim 11.)

Yamazaki '834 and Matsuura '413 teach the construction of an EL device by cleaning an ITO electrode in an oxygen/argon plasma, as discussed above. They are silent as to the energies of the ions in the plasma, and therefore do not teach 10-80 eV for oxygen nor 20-100 eV for argon.

'151 teaches that during plasma cleaning, the energy level of the ions should be controlled in order to prevent damage to the substrate (col. 3, lines 56-64), and particularly suggests that ion energies of about 0-50 eV may be used when performing plasma cleaning with oxygen or argon (col. 3, lines 24-56). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have used oxygen and/or argon ion energies of 0-50 eV as the particular ion energies in the invention of '834 and '413 in order to have prevented the cleaning ions from having damaged the substrate. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because overlapping ranges have been held to be a *prima facie* case of obviousness, see *In re Malagari*, 182 U.S.P.Q. 549.

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Claim 11: A plasma works by stripping atoms of their electrons. Thus, an argon plasma inherently creates positive argon ions. See '371, col. 2, lines 4-29.

Response to Arguments

4. Applicant's arguments filed 10/27/2003 have been fully considered but they are not persuasive.

Applicant argues that Yamazaki charges the EL material, and Applicant argues that the evaporated material should not be charged. The argument is unconvincing because the claims do not exclude applying a voltage to the evaporated material. Applicant's arguments regarding the negative effects of charging the evaporated material are unconvincing because they are not commensurate in scope with the claims, are not supported by evidence, and are contradicted by Yamazaki '834, which teaches that films of desired thicknesses (col. 17, line 55-col. 18, line 20) may be achieved.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Cleveland whose telephone number is (703) 308-2331. The examiner can normally be reached on 8-5:30 M-F, with alternate Mondays off.

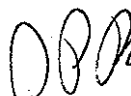
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 306-3186 for regular communications and (703) 306-3186 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Michael Cleveland
Patent Examiner
January 13, 2004



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